

In India the rat flea, *Loemopsylla cheopis*, which closely resembles the human flea, *Pulex irritans*, in appearance, is by far the most commonly found species. In England the common rat flea is *Ceratophyllus fasciatus*; a single specimen only of *L. cheopis* has been found up to the present time.

L. cheopis, especially if hungry, will bite man; *C. fasciatus* does not take to man with any readiness, but will undoubtedly bite on occasion. This difference in the appetite of the two species for human blood may be of significance in determining the likelihood of the spread of rat plague to human beings.

G. F. PETRIE.

PROF. D. P. PENHALLOW.

WE regret to announce that Prof. D. P. Penhallow, D.Sc., F.R.S. (Canada), president of the American Society of Naturalists, and professor of botany in McGill University, Canada, died on October 20, in consequence of an apoplectic seizure, whilst on board the ss. *Lake Manitoba*, on voyage to Liverpool. His remains were brought to Liverpool, and were, in accordance with his wishes, cremated at Anfield Cemetery on Friday, October 28. Prof. and Mrs. Penhallow were about to begin a year's vacation, and had intended spending the winter in the south of England. In consequence of the severe strain of work which Prof. Penhallow had undergone during the last few years, his previously excellent health had shown signs of giving way, and under medical advice he was about to take a prolonged rest, when the lamentable event of his decease occurred.

Prof. D. P. Penhallow was born in 1854 at Kittery Point, in Maine, where his parents had a summer cottage, but their home was in New Hampshire, and Prof. Penhallow always regarded himself as a New Hampshire man. His family were in the direct line of descent from Governor Wentworth, of pre-Revolutionary days, and Prof. Penhallow was a splendid embodiment of the best type of New Englander. He received his scientific education in Boston University, and after graduation he was offered the post of professor of botany in the Imperial College of Agriculture in Japan. In the same year (1876) he married Miss Sarah Dunlap, who, like himself, could boast of a distinguished New England ancestry, and the first four years of his married life were spent in Japan. He thus enjoyed the distinction of being one of the group of Western students who were chosen by the Reformed Japanese Government to inaugurate the epoch of Meiji (intellectual enlightenment) in Japan.

Returning to America in 1880, he undertook work in connection with the summer school of botany in Harvard University, and in 1883 he was offered the newly-created chair of botany in McGill University, Montreal, where the rest of his professional life was spent. He had a very uphill fight in Montreal, which he manfully fought. There was no botanical laboratory and there were no funds to provide one; but as Prof. Penhallow gained the respect and esteem of the community help was forthcoming, and before he died the botanical laboratory was exceedingly well equipped. When he was appointed obscurantist views prevailed in Montreal, both in the city and in the University, and Prof. Penhallow was one of the very first to teach evolution, and may thus be said to have helped to inaugurate the epoch of "meiji" in Montreal. In his own science he devoted special attention to the anatomy of woods, both recent and fossil; on this subject he published many valuable papers, and in his great work on "Gymnosperms," which appeared in 1908, he summed up the results of twenty years' labour. His eminence in his special department was

cordially recognised by the American scientific world, and when he died he was not only president of the American Society of Naturalists, but vice-president of the American Society of Botanists.

But Prof. Penhallow's activities were by no means limited to teaching in his special subject. He threw himself into every movement calculated to bring a wider intellectual outlook into Montreal and Canada generally. He instituted courses of lectures to teachers, which had for many years a beneficial effect on those engaged in instruction in the public schools of the city. He was a leading member of the Canadian Royal Society, and in 1897, when the British Association met in Toronto, he was appointed a member of a committee to impress on the Canadian Government the desirability of founding a marine biological station. The Government acted in accordance with the advice of this committee, and in 1899 a small floating station was started, which was moved from place to place in eastern Canadian waters.

When in 1907 the Government was persuaded to give a grant towards the foundation of a permanent station at St. Andrews, Prof. Penhallow was deputed by the Biological Board to supervise its erection. When he arrived at St. Andrews it was found to be necessary not only to build the station, but to cut a road through a mile of forest and to build a wharf. No one was ready to undertake the contract for this work, and those who were ready to undertake part of it, when they discovered that it was to be paid for by "Government money," would only do so at exorbitant prices. With characteristic American energy and versatility, Prof. Penhallow threw himself into the breach, became contractor himself, and constructed the road, the station, and the wharf in one-third the time he was told it would require, and at a great saving in cost. Next year he superintended the activities of the station, but a political crisis at Ottawa temporarily stopped supplies, and the anxiety and financial strain which he underwent undermined his health, and, in the opinion of his friends, constituted the first link in the chain of causes which led to his death.

Prof. Penhallow is survived by his wife and by his son, Dr. P. Penhallow, who is engaged in medical practice in Boston. By his death McGill University loses one of its most distinguished professors, the city of Montreal one of its most public-spirited citizens, and the science, not only of botany, but of marine biology generally, a devoted supporter who could ill be spared.

E. W. M.

NOTES.

WE learn with great regret that it has been found necessary to postpone the festivities arranged to take place at Leyden to-day (November 3). On this date Prof. van Bemmelen completes his eightieth year, and he was to have received the personal congratulations of friends and disciples from all parts of the world. Owing to his illness, the ceremony is to be confined to the formal presentation of the jubilee volume by Prof. Lorentz, if, as is hoped, Prof. van Bemmelen is sufficiently recovered to receive him. The jubilee volume is a remarkable testimony to the regard which is felt throughout the world for the distinguished second founder of colloidal chemistry. It contains a portrait, together with a biography and a bibliography of the professor's published works. Sixty papers on subjects connected with the colloidal state have been contributed by workers from all parts of the world. Amongst the authors are le Chatelier, Duhem, Zsigmondy, Liesegang, von Wiernarn, Hissink, Freundlich, Biltz, Spring, Hardy, Svedborg, Jordis, Wolf, Ostwald, Lotter-

moser, Nietzk, Spiro, Bechold, Tamman, Barus, Bredig, Lorenz, Malfitano, &c. The volume is published by C. de Boer, Helder, Holland.

THE Allahabad *Pioneer Mail* of October 7 contains a melancholy review of a resolution recently passed by the Punjab Government regarding the prevention of plague. This resolution records that, in the opinion of a committee consisting of plague experts and district officers of experience, "no remedy has been found for the disease; that the people generally will not go to plague doctors to be treated when suffering from plague; that disinfection of houses by means of chemicals, or even by heat, as a means for checking or preventing an epidemic is useless; that rat destruction by poison or trapping is almost equally useless; and that inoculation, though a splendid means of individual protection, cannot be used to check the epidemic owing to popular prejudice." As the result of this, the Punjab Government propose, while keeping on the field the establishment of plague doctors, to reduce the cost if possible, and make suggestions as to how this can be done. It is not easy from this report in the *Pioneer Mail* to analyse the evidence upon which the Punjab Government acts, but the paper must cause melancholy reflections among the friends of India. Is it not true that the words *non possumus* are somewhat frequently heard from the mouth of the Government of India? We have just listened to them in connection with malaria prevention, and we have heard them over and over again in connection with the prevention of cholera. Perhaps a complete reform in the sanitary service of the country, with much more attention to sanitary investigation and a more generous employment of trained scientific workers, would not only save the Government the waste of much money on fruitless efforts, but would also do more to ensure success in the future.

COLONEL W. C. GORGAS, who has done such splendid work in removing mosquito-borne diseases from the Panama Canal zone, sends a short letter to the *Times* of October 28 in which he gives the death-rates for that area; and they are so remarkable that we here reprint his facts. Colonel Gorgas says:—"For the years since our occupation the statistics for the city of Panama have been as follows:—

Year	Population	No. of deaths	Death-rate per 1000
1905 ...	21,684	1,447	65.82
1906 ...	25,518	1,142	44.75
1907 ...	33,548	1,156	34.45
1908 ...	37,073	1,292	34.83
1909 ...	40,801	1,038	25.44

The rates for the Canal Zone, under American jurisdiction, including the cities of Colon and Panama, are as follows:—

Year	Population	No. of deaths	Death-rate per 1000
1905 ...	56,624	2,828	49.94
1906 ...	73,264	3,544	48.37
1907 ...	102,133	3,435	33.63
1908 ...	120,097	2,983	24.83
1909 ...	135,180	2,459	18.19

Among employés the rates have been as follows:—

Year	Employés	Death-rate per 1000
1905 ...	16,511	25.86
1906 ...	26,475	41.73
1907 ...	39,343	28.74
1908 ...	43,890	13.01
1909 ...	47,167	10.64

There has been no case of either plague or yellow fever on the Isthmus since 1905. We admitted to our hospitals for malaria in the year 1905, 514 cases for each thousand

employés; in 1906, 821 cases for each thousand employés; in 1907, 424 for each thousand employés; 1908, 282 for each thousand employés; and 1909, 215 for each thousand employés."

THERE seems little doubt that the four deaths reported recently at Freston, in Suffolk, were due to plague. To prevent any further development of the disease, active measures are being adopted to effect a general destruction of rats in Freston and the neighbourhood. The southern part of rural Ipswich has been systematically explored, and large quantities of poison laid down. The Samford Rural District Council has issued a warning notice pointing out that it is dangerous to touch dead rats with the naked hand, and urging their burial without delay. The public has been requested not to eat rabbits or hares killed in the district. The notice also urges a general campaign against uncleanness and insects. The question of destroying rats over a wider area than that proposed has been raised, as many dead rodents have been found north of the Orwell. It is pointed out that the increase of rats can be traced to the practical extinction of their natural enemies—owls, kestrels, and hawks, which are now seldom seen in the locality. The origin of the disease is still uncertain, but there is reason to believe, in view of the plague at Odessa, that grain vessels from the Black Sea to the River Orwell may have brought over plague-stricken rats. The position of knowledge as regards the relation between rats and the spread of plague is described in an article elsewhere in this issue.

IN the gardens of the Zoological Society of London, Regent's Park, there is now in flower a specimen of *Agave Americana*. The Agaves are popularly known as "American" Aloes; but there are no true Aloes in America, the genus being almost entirely confined to South Africa. *Agave* is a member of the natural order Amaryllidaceæ, and *Aloë* of the natural order Liliaceæ. Another popular fallacy connected with the Agaves is the belief that the plants flower after 100 years and then die, hence the *Agave* is sometimes called the century plant. The facts are these, that the plants, being monocarpic, are only capable of flowering once, but the age at which a particular specimen will flower is determined by many circumstances, including constitutional characters and the suitability or otherwise of the conditions in which the plant is growing. These remarks apply specially to *Agave Americana*, for another species, namely, *A. Sartorii*, is capable of flowering from year to year. *A. Americana* has very thick leaves of from 4 feet to 6 feet in length. They have sharp prickles all along the margins, and each leaf has a stiff, sharp point 1 inch to 2 inches long; these latter are sometimes called "Adam's needles." The plant contains fibre in the roots and leaves, and the fibre is used for commercial purposes. Agaves are cultivated for ornamental purposes in this country, being used frequently as terrace plants in large boxes or tubs. The flower spikes grow very rapidly when once they have formed, their height varying from about 15 feet to upwards of 20 feet. The numerous flowers are greenish-yellow, occasionally quite yellow, but scarcely golden as they are sometimes described. The plant which is now flowering at Regent's Park has stood out of doors during the summer, but it is blooming in the warm atmosphere of the reptile house. Another specimen bloomed in the same gardens in 1906, and two specimens flowered in the Victoria Park, London, in 1902. In Mr. Smith's gardens in the Scilly Islands a dozen or more specimens flowered out of doors in 1875, and in the south of France Agaves in flower are not un-

common objects. There is a variegated variety of *A. Americana* which is more ornamental than the type.

It is announced in the *Revue scientifique* that Prof. Kammerling Onnes, of the University of Leyden, has put his cryogenic laboratory at the disposal of Madame Curie for her researches on radio-activity at low temperatures.

THE daily Press has recently given currency to a vague report that a "vast lake" has been discovered in an unexplored part of north-western Canada by Indians, which they declare to be as large as Lake Superior. The report is hardly likely to be correct so far as the size of the lake is concerned.

A COURSE of twelve lectures on "The Coasts of Great Britain and Ireland" (Swiney lectures on geology) will be delivered by Dr. T. J. Jehu in the lecture theatre of the Victoria and Albert Museum, South Kensington, on Mondays and Tuesdays at 5 p.m., and Saturdays at 3 p.m., beginning Saturday, November 5. Admission to the course is free.

A REUTER message from Vienna states that on October 28 the Radium Institute created there by the Academy of Sciences was formally opened by the Archduke Rainer. The new institute is to be devoted solely to chemical and physical research, and will be open to scientific men of all countries. The institute has at its disposal three grams of radium from Joachimsthal.

At the annual general meeting of the Cambridge Philosophical Society, held on October 31, the following officers were elected:—*President*, Sir George H. Darwin, K.C.B.; *vice-presidents*, Dr. Fenton, Prof. A. C. Seward, and Prof. H. F. Newall; *treasurer*, Prof. E. W. Hobson; *secretaries*, Mr. A. E. Shipley, Dr. Barnes, and Mr. A. Wood. The new members of the council elected are Mr. E. A. Newell Arber, Sir Joseph J. Thomson, and Mr. J. E. Purvis.

THE Chemical Society's banquet to past presidents, which was postponed from May 26, will be held at the Savoy Hotel (Embankment entrance) on Friday, November 11. The banquet is in honour of the following past presidents who have attained their jubilee as fellows of the society:—Prof. William Odling, F.R.S., the Rt. Hon. Sir Henry E. Roscoe, F.R.S., Sir William Crookes, F.R.S., Dr. Hugo Müller, F.R.S., and Dr. A. G. Vernon Harcourt, F.R.S.

THE Berlin correspondent of the *Times* states that the German Ministry of the Interior has called a meeting to be held within the next few days to consider whether the foundation of a special institute for aviation research is practicable, or whether the work can be better carried out by existing institutions. Delegates from the Imperial Government and the Federal States will be present, together with representatives of the German technical universities, of various associations connected with aviation and motors, and of the industries concerned.

THE death is announced of Dr. D. J. B. Gernez, member of the Paris Academy of Sciences and a former collaborator of Pasteur. From a notice in the *Times* we learn that Dr. Gernez was born in 1834. On the completion of his studies he filled various posts as a teacher of scientific subjects. While engaged upon professorial work at the Lycée Louis-le-Grand he assisted Pasteur in some of his researches, and was for many years an intimate friend and collaborator of the great French investigator. For more than twenty years Dr. Gernez was a lecturer at the Ecole Normale de Paris, a post which he held simultaneously

with professorships at other great educational institutions, and from which he retired in 1904. Dr. Gernez was the author of a number of treatises on scientific subjects, and was an Officer of the Légion d'Honneur.

At the general meeting of the Royal Society of Edinburgh, held on October 24, the following office-bearers were elected:—*President*, Sir William Turner, K.C.B., F.R.S.; *vice-presidents*, Prof. Crum Brown, F.R.S., Prof. J. C. Ewart, F.R.S., Dr. J. Horne, F.R.S., Dr. J. Burgess, Prof. T. Hudson Beare, Prof. F. O. Bower, F.R.S.; *general secretary*, Prof. G. Chrystal; *secretaries to ordinary meetings*, Dr. C. G. Knott, Dr. R. Kidston, F.R.S.; *treasurer*, Mr. J. Currie; *curator of library and museum*, Dr. J. S. Black; *councillors*, Prof. J. W. Gregory, F.R.S.; Dr. A. P. Laurie, Prof. Wm. Peddie, Prof. H. M. Macdonald, F.R.S., Prof. D. Noël Paton, Dr. W. S. Bruce, Prof. F. G. Baily, Dr. J. G. Bartholomew, Dr. R. H. Traquair, F.R.S., Prof. James Walker, F.R.S., Prof. A. Robinson, and Dr. W. S. McCormick.

A MEETING of the Optical Convention executive committee was held on October 25 in the rooms of the Chemical Society to consider the desirability of holding a second convention in the year 1912. On the motion of Dr. R. T. Glazebrook, C.B., F.R.S., it was resolved that a meeting of the permanent committee, which all members of the trade and others interested be invited to attend, be held some time in November to consider what action should be taken with the view of organising an optical convention in 1912. The time and place for this meeting will be announced as early as possible. The chair will be taken by Dr. Glazebrook, director of the National Physical Laboratory, as chairman of the permanent committee, and a statement of the principal matters to be brought forward for consideration at the meeting will be published in due course.

THE magnetic survey yacht *Carnegie* left Para, at the mouth of the Amazon, under the command of Mr. W. J. Peters, on October 15, bound for Rio de Janeiro. This vessel, since leaving Brooklyn last June on her present cruise of three years in the Atlantic, Indian and Pacific Oceans, had covered nearly 7000 miles up to Para, during which portions of the first cruise were several times intersected by the introduction of loops. It is reported that the magnetic results obtained on the present cruise up to Para have fully confirmed the errors revealed by the first cruise in the existing magnetic charts of the North Atlantic. From Rio de Janeiro the *Carnegie* will proceed to Montevideo and Buenos Aires, and thence across to Cape Town, where she is due towards the end of March, 1911. At the latter port the director, Dr. Bauer, expects to rejoin the vessel, and be with her on the portion of the cruise in the Indian Ocean. *En route* to Cape Town, Dr. Bauer is to visit certain magnetic institutions in Europe in order to perfect arrangements for cooperative magnetic survey work.

THE *Morning Post* National Fund Airship made a flight from Moisson to Aldershot on October 26. The airship left Moisson at 10 a.m. (French time), the coast of France near St. Valéry en Caux at 12 noon, passed over the English coast-line near Rottingdean at 2.18 p.m., and reached Aldershot at 3.28 p.m., being brought to earth at 4.5 p.m. The distance of 197 miles was accomplished in 5h. 28m. The rate of speed was about 36 miles an hour, including partially adverse wind conditions. The airship carried a crew of eight. During the journey 528 lb. of ballast were used; 400 litres of petrol were consumed by

the engines, and at the moment of landing there were 880 lb. of water ballast, 990 lb. of petrol in reserve, in addition to at least 200 litres in the reservoirs. The engines started at 850 revolutions; they then worked up to 900 revolutions, and fell again to 850, and only finally during the landing worked at their full power of 1000 revolutions. The highest altitude reached was 2120 feet, and throughout the sea passage there was a steady level of about 200 feet. The overall length of the airship is 337.75 feet, and the water- and gas-proof envelope has a capacity of 353,165.8 cubic feet.

An appeal is made for funds to erect a new building for the Royal Society of Medicine. Of the sum required, the society has already provided 17,000*l.*, and it asks that not less than 26,000*l.* may be contributed from without, so that it may not be compelled to curtail its very valuable public and scientific work. Towards the money in hand 8500*l.* has been subscribed by members of the medical profession. The Lord Mayor has become chairman of a Mansion House committee formed to promote the raising of upwards of 30,000*l.* for the new building. The governor of the Bank of England has opened an account for the receipt of donations, which may be sent to the Bank of England, payable to "The Royal Society of Medicine Building Fund," or to the Lord Mayor at the Mansion House. The society now has 3200 fellows and members, and possesses a library of nearly 100,000 volumes. It was originally founded in 1805, under the name of "The Royal Medical and Chirurgical Society." A new charter was granted it in 1905 under the new name of "The Royal Society of Medicine."

SEVERAL of the Parisian hospitals entertained their visitors last Christmas to cinematograph exhibitions, in which very realistic phases in the life-history of various pathogenic organisms were thrown on the lantern screen. On October 28 Messrs. Pathé Frères, of Paris, gave the members of the Medical Society of King's College Hospital an opportunity of seeing some of their most successful applications of the cinematograph to bacteriological photomicrography. The films shown represented (1) the experimental production of sleeping sickness in a rat, and the movements of the trypanosomes in the blood; (2) the spirochaeta of recurrent fever, and the ticks which convey the parasite; (3) the spirochaeta of fowls, some of which were seen imprisoned and revolving within the red corpuscles; (4) the movements of the infusoria from the intestine of a mouse; (5) *Trypanosoma lewisi* of the rat; (6) *Spirochaeta pallida*, which, although only 1/2000th of a millimetre in width, could be followed in its movements across the field of the microscope. Other films were shown representing involuntary movements of the embryo of the Axolotl and its emergence from the egg, and the movements of the human stomach as seen during an X-ray examination of a patient. There can be no doubt that these films are a triumph of technique, but the gain at present is rather in favour of the public entertainer than of the worker in science. The main advantage from a scientific point of view is that rapid movements may be slowed and analysed, while slow movements may be accelerated, and thus realised. Such films will become an essential part of the equipment of every physiological and medical workroom.

THREE years ago the council of the Royal College of Surgeons, England, instituted demonstrations in connection with the museum. At one of these, given in the theatre of the college on October 28, the conservator, Dr. Arthur Keith, showed a series of specimens illustrating irregularities in the differentiation of sexual characters. The

museum is peculiarly rich in specimens of this nature owing to the fact that John Hunter, its founder, had preserved many preparations which illustrated the influence of the sexual organs in determining the growth and features of many parts of the body. Amongst these are the specimens which show the assumption of the male plumage of aged pea-hens and hen pheasants. Preparations added to the museum by Mr. S. G. Shattock show that such an alteration of secondary sexual characters is accompanied by a change in the sexual glands, usually of an atrophic nature. A Leghorn fowl, in which the external characters were those of a cock rather than of a hen, had genital glands of an ovo-testicular type. The Hunterian preparations, illustrating the sexual organs of the "Free-Martin"—a form of ox born as the twin of a perfect bull calf—were also exhibited. Although these specimens had been preserved for more than 150 years, their tissue was in perfect condition for microscopical examination. In one case Hunter was of opinion that both testes and ovaries were present in the same individual (a true hermaphrodite), but on microscopical examination it was found that the "ovary" was really a mass formed by a remnant of the Wolffian body. A higher vertebrate with both testes and ovary has not yet been seen. Hunter explained all irregularities in the development of the accessory sexual organs and of "secondary" sexual characters as the result of an "imperfection" in the development of the testis and ovary. All museum specimens and recent experiments are in favour of his interpretation.

THE third part of the fourth volume of *Memoirs of the Peabody Museum* is devoted to an account by Mr. Teobert Maler of a series of adventurous journeys starting from the north of Yucatan and extending to the great lake of Peten-itza, in Guatemala. The value of the memoir would have been enhanced by a sketch of the routes, which are not traceable on ordinary maps. Several important sites representative of the Maya-Toltec culture were identified, such as Motul, where a remarkable stela depicting a pair of dancing priests was found, Tubusil, Silbituk, and the remarkable island city of Itza-Flores. When the country passes under the control of a decent government the great lake of Peten will be brought into connection with the sea, and vast economical resources of this region will be developed, with the result that the remarkable ruined cities connected with the career of Cortes will receive adequate examination.

IN the *Oxford and Cambridge Review* for Michaelmas term Dr. A. Smythe Palmer concludes his study on the luck of the horse-shoe. He arrives at the conclusion that it is derived from the cult of the new moon, which was adopted by primitive races as a symbol of recovery and good fortune. Incidentally, he has collected some curious examples to show that the symbol was regarded as possessing magical power among the prehistoric people of Europe, as is proved by various records of the discovery of horse-shoes in ancient interments, by the shape of many tumuli, and by the ring of trilithons at Stonehenge. He further points out that, following Babylonian precedent, the rising moon lying on her back was believed to be a silver boat. He thus disposes of the controversy between two sets of people who use the talisman in our days—one preferring to fix it with the heels upwards, the other downwards—in favour of the former.

IN the *Field* of October 22 Mr. Lydekker points out that the new antelope described in *NATURE* of September 29 (p. 397) as *Strepsiceros buxtoni*, with the alternative name of *Tragelaphus buxtoni*, should be known by the latter title.

In the *Zoologist* for October Mr. F. J. Stubbs adduces further evidence, especially an Act of 1564 (2 Eliz. c. 15), to show that egrets were formerly common in England. "At the middle of the sixteenth century England was the home of an egret that was highly esteemed for the table. It nested with us, and was protected by law; and the same, or an allied, species inhabited an adjacent part of the Continent, and was brought to this country alive for food. Probably the bird was not altogether white, thus differing from any existing European egrets or herons, and resembling species now found in America."

VARIATION in the oyster-boring whelk (*Urosalpinx cinereus*) forms the subject of an article by Dr. H. E. Walter in the October number of the *American Naturalist*. This mollusc is a native of the Atlantic coast of North America, but was unavoidably introduced when oysters were transplanted to the Pacific shore. It was the original object of the article to compare these introduced Californian whelks with their Atlantic prototypes, but comparisons were extended to a wider basis. As the result of the investigation, it appears doubtful whether *Urosalpinx* is more variable in its new than in its original home.

As fossilised birds' feathers have hitherto been recorded from only some fourteen localities—with one exception of Tertiary age—brief reference may be made to Mr. F. Chapman's description in vol. xxiii., part i., of the Proceedings of the Royal Society of Victoria, of a fossil of this nature from the Tertiary ironstone of Redruth, Victoria. No definite determination of the genus of the specimen, which is in the form of impressions on the two halves of a split nodule, is attempted, although it is suggested that it may have belonged to one of the smaller waders, such as the ibises.

THE third botanical number of the current volume of the *Philippine Journal of Science* contains a compilation of new or noteworthy Philippine plants, and a sixth part of an index to Philippine botanical literature, both prepared by Mr. E. D. Merrill. Among the new plants, about a hundred in number, mostly trees or shrubs, there are eleven additions to the genus *Ardisia*, ten to *Ixora*, and six to *Hiptage*; also new genera, *Astrocalyx* and *Cephalomedinilla*, are proposed under the family Melastomaceæ, *Curraniodendron* under Saxifragaceæ, and *Pygmæopremna* under Verbenaceæ. With reference to *Ixora*, it is noted that *Ixora coccinea* does not grow wild, but a closely allied species, *I. philippinensis*, is abundant and widely distributed.

An enumeration of twenty-eight flowering plants and ferns growing on a London building site, about half an acre in extent, in Farringdon Street that has been vacant for two years is communicated by Mr. J. C. Shenstone to the *Selborne Magazine* (October). As the author points out, the chief interest lies in the methods of distribution by which the plants have reached the spot, and he has classed them as wind-distributed, kitchen refuse weeds, and forage or packing weeds. It is extremely puzzling to find a growth of bracken fern, since the plant is very difficult to transplant, and the appearance of *Ficus Carica* is not immediately explicable. Three casuals, that is, plants not indigenous to Britain, are provided by *Epilobium angustifolium*, *Senecio viscosus*, and *Erigeron canadense*.

OF the flowers which undergo marked changes after fertilisation, tropical orchids afford some striking examples. For instance, it frequently happens that after the pollinia reach the stigma the flowers fade prematurely, the column

swells, the stigmatic surface becomes enclosed, and eventually the ovules begin to develop. It would generally be assumed that these changes can only be induced by the stimulus of the pollen on the stigmatic surface, and the subsequent growth of the pollen tube. It has, however, been observed by Dr. H. Fitting, as is pointed out in the *Gardener's Chronicle* (October 29), that certain of these effects can be produced by inorganic means. Thus scratching the stigmatic surface suffices to cause premature withering, and the application of dead pollinia or an extract therefrom may bring about swelling of the column; but apparently development of the ovules does require the stimulus induced by the pollen grains penetrating the ovary.

AMONG the numerous articles now appearing in agricultural publications on the growth of sugar-beet in England, one, by Mr. Chas. Bathurst, M.P., in the *Agricultural Students' Gazette* (vol. xv., part i.) deserves some attention. The importation of beet sugar into Great Britain is steadily increasing, and amounted in 1908 to nearly eighteen and a half million pounds sterling in value. Much of this could be produced in England, but the operation of the sugar bounties rendered the industry financially impracticable. Now that the bounties are abolished by the Sugar Convention, active steps are being taken in several counties to start factories, which, in Mr. Bathurst's view, should prove distinctly profitable unless an excise duty is placed on the sugar. An average crop is given as 18 tons per acre, selling at the factory for 18s. per ton, or 16l. 4s. The cost of production, including the rent of the land, should not exceed 9l. per acre, leaving a profit to the cultivator of 7l. 4s. per acre.

THE summary of the weather issued by the Meteorological Office shows that for the eight weeks of autumn as yet expired the aggregate rainfall has been largely deficient over the entire area of the British Islands. The greatest deficiency occurs in the north of Scotland, where the total rainfall is only 2.89 inches, which is 6.24 inches less than the average of the corresponding period for the last twenty-five years. In the west of Scotland the deficiency is 5.13 inches, the aggregate rainfall being only 3.10 inches. In the north of Ireland the deficiency is 3.98 inches, and in the north-west of England 3.60 inches. In the south-east of England, which comprises London, the deficiency amounts to 1.16 inches. The duration of bright sunshine for the period is deficient, except in a few northern districts, the greatest deficiency being fifty-eight hours in the east of England and fifty-six hours in the Midland counties. The mean temperature was not very different from the average, but its maximum readings were lower than usual, the absolutely highest temperature since September 4 being 76°, in the Midland counties. Frost at night has, as yet, only occurred in a very few districts. The aggregate rainfall since the commencement of the year is not very different from the average, but there is an excess, except in a few of the northern districts. The duration of bright sunshine as yet this year is generally deficient, the deficiency exceeding one hundred hours in the eastern districts of England.

In the Proceedings of the Amsterdam Academy of Sciences of June 25 Dr. W. van Bemmelen and Dr. C. Braak give a preliminary report upon the investigation of the upper air, begun at Batavia in 1909. The observatory is now equipped with registering balloons and suitable instruments, but it was thought advisable to proceed cautiously in using them so near to the sea before obtaining more knowledge of the drift of the upper currents by means of pilot balloons. The following data showing the

mean decrease of the temperature gradient per 100 metres of the lower 2 kilometres were obtained (1) above the land with a captive balloon and light wind; (2) above the land with a moderate westerly wind, with kites; and (3) above the sea (January 14-20), weather rainy, with kites; but the results are not strictly comparable, owing to differences of time of day:—

Metres	100-500	500-1000	1000-1500
Balloon ...	0.77° C.	0.57°	—
Kite (land) ...	0.87	0.72	0.44° (<1500 M)
Kite (sea) ...	0.91	0.59	0.71

Further kite observations over sea gave for 1500-2000 m., 0.34°; 2000-2500 m., 0.50°; 2500-3000 m., 0.46°. At about 1000 m. the gradient shows a sudden decrease, probably due to the formation of cumulus clouds. The observations of wind direction for the period September-May show that the upper air-current has easterly components up to the greatest heights attained (10-15 km.). The average altitude of the west monsoon was 5.4 km. The upper easterly, as well as the lower westerly, winds were sometimes affected by strong northerly or southerly components. It is mentioned that diagrams of a registering balloon sent up on May 19, during the passage of the earth through the tail of Halley's comet, showed no other noteworthy feature than an inversion of temperature between 6 and 7 km.; the balloon burst at about 7 km.

THE various methods of finding the height of an airship are discussed by Captain Paul Renard in the *Revue scientifique* for September 17. Of the several methods of observing the height from the airship itself, Captain Renard considers that the use of the barometer affords the only practicable one. Of the methods of observing the height from the ground the large majority involve simultaneous measurement of several angles, and this is, in general, impracticable. Captain Renard considers that the best methods are by observation with a telemeter, coupled with a determination of the altitude, or by two simultaneous observations of the altitude at the instant the airship is in the vertical plane joining the two observers.

THE *Builder* for October 29 contains an illustrated article descriptive of the fine building now being erected in London for the Y.M.C.A. This building occupies an island site of some 33,000 square feet, bounded by Great Russell Street, Bedford Avenue, Tottenham Court Road, and Caroline Street. Reinforced concrete plays an important part, and has been employed for the solution of various structural problems of considerable magnitude. The building is not one of the reinforced concrete skeleton class merely sheathed in masonry, but rather is a combination of masonry with reinforced concrete, the latter material taking the duties hitherto very generally assigned to structural steel-work in modern architecture. Thus we find reinforced concrete columns, beams, and wall lintels forming the backbone of masonry features, and bearing a large proportion of the loads to be supported, yet without involving any noticeable departure from the familiar aspect of masonry. In some important respects reinforced concrete is exclusively adopted, as in floor, roof, gallery stairway, and swimming-bath construction, and in the form of exceptionally large girders. The details of the reinforced concrete work were prepared by Messrs. L. G. Mouchel and Partners, in accordance with the Hennebique system.

An article by Mr. Fullerton L. Waldo on recent progress in the construction of the Panama Canal appears in the *Engineering Magazine* for October. Rapid progress

has been made in the great lock-works and the huge dam that is rising at Gatun. The three lock flights divide the vertical distance to the 85-foot level between them, whereas the locks of the Pacific division have lifts of 33½ feet and 54½ feet respectively. The usable dimensions of the locks are 1000 feet by 110 feet, giving ample margin for even the new White Star liners, the overall dimensions of which are 890 feet in length and 92 feet in width. It is calculated that the lock-stair at Gatun will require about 1½ hours for the transit; the Pacific locks will detain the vessels for about the same length of time. The total passage across the Isthmus will take about 10 to 12 hours. The train takes about 2½ hours, so that passengers will probably prefer this method of transit. About 15 minutes are required to fill the lock chamber, but in case of need for haste the process can be completed in about half this time. The available water supply will allow of 48 lockages per day, which might mean an average of something like 80,000,000 tons of traffic annually as compared with 21,000,000 tons in the case of the Suez Canal and the 40,000,000 tons of the Sault Ste. Marie.

WE have received the first five numbers of a leaflet entitled *Hygieia*, which is published by the Bureau of the International Congress of Hygiene, which is to be held in Dresden in 1911. It contains notices with regard to the congress and brief abstracts of papers dealing with subjects appertaining to hygiene, e.g. sugar as a food-stuff, taverns as hospitals, cleansing of towns, &c.

MESSRS. NEWTON AND CO., Fleet Street, London, have issued a supplementary list of lantern-slides for the present session. Among many others, we notice numerous astronomical slides dealing with Halley's comet, the moon, and Greenwich Observatory; a set of slides showing Sicily and Messina after the earthquake; sets to illustrate eight lectures on India, drawn up by Mr. H. J. Mackinder for the Visual Instruction Committee; and slides showing aerial experiments and aeroplanes.

THE Penny Science Lectures at the Royal Victoria Hall, Waterloo Road, S.E., during November include:—November 8, "Early Men in Britain," W. Lower Carter, and November 22, "Liquid Air," Dr. R. Whittan Gray.

MR. H. K. LEWIS, of Gower Street, London, has published a catalogue of new books and new editions added to his well-known medical and scientific circulating library during July, August, and September of this year.

OUR ASTRONOMICAL COLUMN.

FIREBALL OF OCTOBER 23.—Mr. W. F. Denning writes:—"The fireball of Sunday, October 23, 8h. 12m., was observed at Kenley (Surrey), Ilford (Essex), and in Wales, as well as at other places. It appears to have passed over the sea N.E. of the mouth of the Thames at heights of 84 to 40 miles. The length of the luminous course was about 75 miles, and the velocity 19 miles per second. Radiant near α Arietis.

"The observation of the meteor from stations in Wales is interesting, and it is probable that the object was seen from a great many towns in England, for it appeared at a time when many people would be out of doors. The sky was, it is true, cloudy at some places and veiled the brilliant light of the meteor, but it was a very fine one, and gave several flashes as it slowly sailed along the E.N.E. as seen from the neighbourhood of London. It is important that if any further observations of an exact character were made they should be published, so that the flight of the object may be investigated accurately."

THE MOTION OF MOLECULES IN THE TAIL OF HALLEY'S COMET.—In a recent note in these columns (September 29, p. 404) attention was directed to some results published